Team Accomplishments and Data Collection

Besides building a robot, what to FIRST teams do? There’s fundraising, impacting the community, and countless other side projects. To know where to focus a team’s energy and write award submissions, collecting and using data are vitally important. A data collection system is only successful if it asks the right questions, contains correct and consistent data, and is useful for team goals.

**Background**

Data collection is an essential part of every robotics team. One of the important parts of being a FIRST team is spreading the message of FIRST and inspiring others to be interested in STEM. This impact needs to be recorded somehow, and that’s why data collection is so important. Throughout this tutorial you will learn about creating a system to input the data, determine what you you want to measure, how to efficiently run your data collection system, and how to best use the data you collect to convey a message.

**Choosing Metrics**

You only get the data that you ask for. That’s why the initialization stage is so important to the success of a system. At the same time, asking too many questions can become tedious and deter members from consistently providing quality data. Here’s the process to make your own choices for what data you collect. The first and most important component to completing this step is asking *why* you’re collecting the data in the first place.

**Why?**

Simply put, the two most useful reasons for collecting data are: guiding the direction of your team and awards submissions. There are other reasons for data collection, but these tend to be the most important. Identify the biggest reasons to you and then begin asking in which areas you want to collect data. When writing your Chairman’s submission, what would you like to highlight? More than simply the number of kids you impacted, qualify this data with questions about what kind of interaction you had with them. What was your target group when you reached out? You may also want to capture information about your contact so that you can continue the event in future years. By knowing what you need, you can form the data much more effectively.

**Choosing Questions**

The system available in Appendix A comes with options for business presentations and demos, community events and service, legislative outreach, school outreach, and a few other categories. You can use as many or as few of these as you like. For each of your different categories, there are certain questions that we wanted to ask no matter what. For example, who is filling out the form? For your event, how many students and adults were there? How long and what day was the event? Are there any notes or pictures you want to add? These should go in an entry form, so that there is no individual webpage that has so many questions that it is intimidating.

From there, ask more detailed questions that give you the data you need but no more. Keep the questions succinct and always go for the most specific data type with the most strict validation. A question asking “What time do you wake up in the morning?” is useless if its responses are all in different formats (i.e. “9AM”, “8:00”, “seven o’clock”). Do less work by forcing your user to be as specific as possible.

(See Appendix A for instructions on how to fill out your forms using our Data Collection System)

**Recording Data (Running & How)**

It is important that data is collected in an efficient and effective way, so a system must be put in place to keep all the data accessible and organized. Whenever an event is planned it is important that the responsibility of data entry is given to a member, and is promptly inputted into the system. It is also important to have a system in which the quality of the data is checked and verified. A data lead should be determined who knows all of the events that will be taking place and can accurately verify the data as it is entered.

**How?**

One of the main roadblocks teams face in a data storing system is making sure that everyone knows how to use the system in place. This can be overcome by demonstrating the system at the beginning of the season so that anyone on the team can take the responsibility of data input for any given event they are attending. Once everyone has the training to be able to input data, you need another system in which people get assigned the role data input person for each individual event. One way of achieving this is through a team calendar, and to put an event on that team calendar whoever is inputting the data must be specified beforehand. Getting the data inputted into the system requires strong organization, but with a consistent procedure it can be pulled off seamlessly.

**Running Your System**

There are also some important ideas to keep in mind when administering a data system. It is vitally important that the data gets verified as quickly as possible. This is relevant because in case the data is inputted incorrectly, the mistake needs to be caught while the event is still fresh in their minds, so the data can still be re-inputted to be true. Your data lead should check the data verification sheet at the beginning of every meeting to verify anything that has been inputted. This will take away some meeting time each day, but it will make the use of this data much more easy and efficient, because it is already formatted and correct.

**Use the Data**

Data in itself has very little value. In fact, it costs money to hold it somewhere. What we are able to learn from and do with the data, however, has immense value. Effectively drawing conclusion and actionable insights from data, although difficult, is useful no matter where you are.

**What?**

At a high level, every organization that records and uses data must understand *what* their data is saying. Sometimes it can be simple. How many people buy coffee with whipped cream versus without? Do people have more or less positive reactions to this ad compared with another? However, many times there aren’t obvious conclusions to be drawn from the data. There are so many variables that may or may not contribute to outcomes. Sometimes they all play a role. Sometimes you haven’t collected data on the most important part.

In a robotics context, the conclusions that we’re drawing aren’t as high stakes. They don’t affect our bottom line or profit margin. There is little in the way of optimization. However, the exercise still has use.

**Using Your Data**

For us, there are two main ways to use data. First, we have a plan of where we want to go and what kind of impact we’re looking to make. By matching our data against these goals, we can see where we are at in our progress. We even can see what works well, what doesn’t, and where to guide members in the future. Another important use for data also involves measuring progress. Data is evidence for awards submissions. In our Chairman’s and other award submissions, we build our story and then match the data that we’ve collected to each part of the story. This shows judges real examples of our impact.

(See Appendix A for more information on viewing and exporting data using our Data Collection System

Appendix A - Data Collection System

Look on <https://github.com/skunkwile/outreachTool> for documentation on setting up the system.

**Setting Up Questions**

To add a question to a page on the form:

1. Select the appropriate tab on the bottom of the window.
2. Press the “Add Row” button in the top left-hand corner
3. Give the field a name by editing its value in the “Name” column
4. Select a type. See below for a description of the different types
5. In the “Label” column, write the label that you would like to appear beside this question when a user fills out your form
6. [Optional] The “Max Length” column limits the number of characters that users are allowed to enter to your field.
7. [Optional] For numeric amounts, “Max” and “Min” are the maximum and minimum values allowed into the form
8. [Optional] If the form is a drop down list or radio buttons, the “listName” column reflects which values are shown to the user when they fill out the form. By clicking the “Edit List” button in the top-right corner while the row with your list name is selected, a popup will allow you to edit the values of your list.
9. [Optional] If you have a checkbox with sub-questions or a radio select with sub-questions, you may have other fields that show up based on the user’s choice. To use this feature, fill in the “SubOutreach” column for fields that you only want to appear after a user has made a certain selection. The value in subOutreach should be the same as the “Value” for the specific list item under which it should show.

**Question Types**

Short Text - A single line text field with length validation

Long Text - A multi-line text field with length validation

Whole Number - A single line numeric input field that only accepts whole numbers. Validation checks length, maximum, and minimum as well.

Floating-Point Number - A single line numeric input field that validates length, maximum, and minimum.

Checkbox - Displays a standard yes or no checkbox.

Checkbox with Sub-Questions - Displays a standard yes or no checkbox. When yes, fields that have the appropriate subOutreach value will appear.

Radio Buttons - Displays a list of radio buttons. Each button is labeled with its list name. Only one selection is allowed.

Radio Buttons with Sub-Questions - Displays the same Radio Buttons, however will show fields with the appropriate subOutreach when a given value is selected.

Drop Down List - A simple drop-down list with values from the given list.

Dynamic Drop Down List - A simple drop-down list with one special value. The last item in the list will be “Other,” and if it is chosen then a text field will appear and allow the user to enter any value they please.

**Viewing and Exporting Data**

Data can be viewed and edited using the table. To export it to a standard spreadsheet format, select the “Export Data” button.